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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/083,635	02/25/2002	Shigenobu Nakamura	81707.0173	1804

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HOGAN & HARTSON L.L.P.
500 S. GRAND AVENUE
SUITE 1900
LOS ANGELES, CA 90071-2611

EXAMINER

DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 10/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/083,635

Applicant(s)

NAKAMURA ET AL.

Examiner

Thomas M. Dougherty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 10-12 is/are rejected.
- 7) ☒ Claim(s) 7-9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Komeichi et al. (JP 3-155176). Komeichi et al. show (fig. 10) a laminated piezoelectric device (4) comprising a pole-like laminate formed by alternately laminating piezoelectric layers (1) and electrode layers (2) in the direction of height, and a pair of outer electrodes (7) formed on the different side surfaces of said pole-like laminate, said two electrode layers (7) neighboring each other with said piezoelectric layer sandwiched therebetween being electrically connected at their side surfaces to the outer electrode plates (7) which are different from each other; wherein flexible protruded electrically conducting terminals (2a) are provided on the side surfaces of said pole-like laminate on where the outer electrodes (7) are arranged, said flexible protruded electrically conducting terminals (2a) extending along the side surfaces of the electrode layers (2) and being capable of following the stretching and contraction of said pole-like laminate in the direction of height thereof, and the electrode layers are jointed to said outer electrode plates (7) via said protruded electrically conducting terminals (2a). By sight, said protruded electrically conducting terminals (2a) have a height of protrusion beyond

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the side surfaces of the pole-like laminate which is not smaller than $1/20$ of the thickness of the piezoelectric layer (1).

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Yasuda et al. (4,845,399). Yasuda et al. show (fig. 1) a laminated piezoelectric device comprising a pole-like laminate formed by alternately laminating piezoelectric layers (1) and electrode layers (2) in the direction of height, and a pair of outer electrodes (6, 7) formed on the different side surfaces of said pole-like laminate, said two electrode layers (6, 7) neighboring each other with said piezoelectric layer (1) sandwiched therebetween being electrically connected at their side surfaces to the outer electrode plates (6, 7) which are different from each other; wherein flexible protruded electrically conducting terminals (3) are provided on the side surfaces of said pole-like laminate on where the outer electrodes (6, 7) are arranged, said flexible protruded electrically conducting terminals (3) extending along the side surfaces of the electrode layers (2) and being capable of following the stretching and contraction of said pole-like laminate in the direction of height thereof, and the electrode layers are jointed to said outer electrode plates (6, 7) via said protruded electrically conducting terminals (3).

Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Someji et al. (US 5,254,212). Someji et al. show (fig. 14) a laminated piezoelectric device comprising a pole-like laminate formed by alternately laminating piezoelectric layers (1, 2) and electrode layers (3,4) in the direction of height, and a pair of outer electrodes (9, 10) formed on the different side surfaces of said pole-like laminate, said two electrode

layers (9, 10) neighboring each other with said piezoelectric layer sandwiched therebetween being electrically connected at their side surfaces to the outer electrode plates (9, 10) which are different from each other; wherein flexible protruded electrically conducting terminals (5) are provided on the side surfaces of said pole-like laminate on where the outer electrodes (9, 10) are arranged, said flexible protruded electrically conducting terminals (5) extending along the side surfaces of the electrode layers (3, 4) and being capable of following the stretching and contraction of said pole-like laminate in the direction of height thereof, and the electrode layers are jointed to said outer electrode plates (9, 10) via said protruded electrically conducting terminals (5). A glass layer (7, 8) is formed (see col. 8, ll. 22-25) on the side surfaces of said pole-like laminate on where the outer electrodes (9, 10) are arranged so as to cover the side surfaces of the piezoelectric layers, and the root portions of said. Said protruded electrically conducting terminals have a thickness B of not smaller than 1 micrometer but not larger than one-half the thickness of the piezoelectric layer. Said protruded electrically conducting terminals (5) have a height of protrusion beyond the side surfaces of the pole-like laminate which is not smaller than 1/20 of the thickness of the piezoelectric layer (1, 2). See the discussion of the height dimension of the piezoelectric layers and component 5 at col. 6, ll. 59 and 60 and col. 9, ll. 12-14.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being obvious over Someji et al. (US 5,254,212). Given the invention of Someji et al. as noted above, Someji also notes use of silver for electrode materials (e.g. col. 11, ll. 44-46). He doesn't note the thickness of his outer electrodes or whether or not his outer electrode plates are formed of a conductor which contains at least silver. It would have been obvious to one having ordinary skill in the art to use silver as an electrode material for his outer electrode plates since this is already employed in his device and the additional use would thus result in no material mismatch. The thickness of the component appears to be on the order of the component 5 which is noted as being 40 micrometers. Note that the thickness of this component is a design choice based on the desired size of the overall component. Thus at this time it carries no patentable weight.

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being obvious over Komeichi et al. (JP 3-155176) in view of Yasuda et al. (4,845,399). Given the invention of Komeichi et al. as noted above, he further shows outer electrode plates (7) provided with grooves or slits. Komeichi et al. do not show use of resin between his outer electrode plates and his piezoelectric laminations. Given the invention of Yasuda et al. as noted above, they fail to show their outer electrode plates (6, 7) provided with grooves or slits. It would have been obvious to one having ordinary skill in the art to employ the grooves or slits of Komeichi et al. in the device of Yasuda et al. at the time their invention was made in order to better secure the components together.

Alternatively it would have been obvious to one having ordinary skill in the art to employ

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the resin of Yasuda in the device of Komeichi et al. in order to better secure the components and protect the components from physical damage in the event of dropping or unintended physical contact.

Claim 12 is rejected under 35 U.S.C. 103(a) as being obvious over Komeichi et al. (JP 3-155176) in view of O'Neill (US 4,011,474). Given the invention of Komeichi as noted above, he doesn't note any variety of uses for his device. O'Neill notes at col. 3, ll. 13-16 a variety of uses for his piezoelectric stack device including as an injection valve. He doesn't show outer plates for his electrodes, but wires. It would have been obvious to one having ordinary skill in the art to employ the invention of Komeichi as an injection valve since such devices have a rapid response as injection valves require, which is taught by O'Neill.

Allowable Subject Matter

Claims 7-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to show a plate electrode in a piezoelectric stack configuration on which resides a means to prevent heat generation. Protrusions of glass and metal powder are not noted in the prior art.

Conclusion

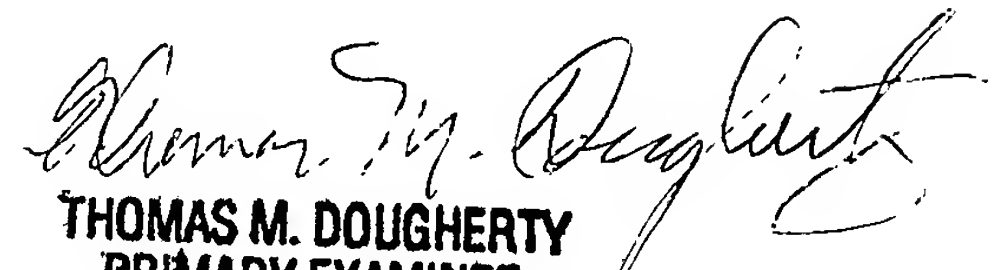
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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on some aspects of the claimed invention.

Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.


tmd

September 23, 2002


THOMAS M. DOUGHERTY
PRIMARY EXAMINER
GROUP 2100
